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ABSTRACT

This is the eighth unit in a series that introduces population concepts into the eighth grade American history curriculum. (See SO 013 782 for an overview of the guide.) In Episode VIII, the history topic is population growth and trends in the United States and developing countries. Objectives are to help the student (1) examine how fertility, mortality, and migration together affect population changes within a society; (2) scruntinize how population change varies from country to country and examine two aspects of change--population size and ratios of population change; (3) investigate some of the major causes and consequences of rapid population growth in the developing countries; (4) explain the relationship between resources and consumption and examine the effects of population growth on resource consumption; and (5) develop the conceptional understanding of the "dependent age group" and the "productive age group" of a population and examine what effects the relative proportions of each have on the sociopolitical structure of society. Activities include having students list components affecting population changes, solving a riddle about population change, designing a plan of action to help eliminate or reduce the population growth problem in Sri Lanka, and debating whether the United States government should introduce technology into a developing country. (NE)

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RESOURCE MATERIAL DEVELOPMENT: POPULATION DYNAMICS IN EIGHTH GRADE AMERICAN HISTORY

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Episode VIII
Comparing Population Change in Societies

Florida State University
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INTRODUCTION

The eight multi-media units of which Comparing Population Change in Societies is a part are designed to help the teacher introduce population concepts into the school curriculum. To assist the teacher in this task an "infusion" approach is used, (i.e., the units are introduced into the curriculum in conjunction with a related regular topic in the school-adopted program). The school-adopted program, in this instance, is American History, and an attempt is made to correlate history topics with population topics. The chart on the following page shows the exact correlations for all eight units. Although points of entry are suggested, it is expected that the teacher will make his own judgement as to when is the most propitious time to introduce each unit or population episode. Certainly, depending on how the teacher organizes his course, he may change the sequence of topics, or decide to concentrate and spend time on only a few episodes. Thus, he may decide to spend more than a week on the chosen topic and engage the class in extended activities.

There are two basic assumptions that underlie this series: (1) Since everyone is a population actor, (i.e., decisions are made everyday on such issues as where to buy a new home, how large a family to have, where to go on a vacation, or how to vote on a local zoning ordinance), we all need to understand population phenomena, and, (2) Since we consider population education to be a rational rather than an emotional process, we stress that population concepts are best taught in an inquiry framework where the causes and consequences of population changes are understood

and where alternatives are offered and the reasons or grounds for holding them are carefully presented and examined. Therefore, we have consistently rejected the use of propaganda or indoctrination in teaching and learning population matters.

More specifically, the Program aims at having students participate in the process of inquiry into the nature of human populations and the natural and human consequences of demographic change. Our main goal is to help the teacher and the students make rational decisions about population matters as members of their family and local community, as well as national and world communities, utilizing appropriate information sources and inquiry skills.

RESOURCE MATERIAL DEVELOPMENT
POPULATION DYNAMICS IN EIGHT GRADE AMERICAN HISTORY

	HISTORY TOPICS	POPULATION TOPICS
I.	European Exploration of the New World	Early Stages of the Demographic Transition; Components of Population Change
II.	European Colonization of the New World	Population distribution and Settlement patterns; population characteristics of settlers.
III.	The Late Colonial Period	Comparisons of factors affecting population size between the English and the colonists; effects of high birth rates on population growth in the colonies.
IV.	Union Under the Constitution	Taking a population census under Article I; comparisons made between the census of 1790 and 1970.
V.	Westward Movement, Civil War and Reconstruction	The Changing Regional Balance of the Population; black migration from the south; westward migration
VI.	The Rise of the Cities and Industrialization	Rural/urban differentials in the population; industrialization and the urbanization of America.
VII.	America Becomes a World Power	Immigration as a Component of Population Change
VIII.	United States and World Affairs	The United States in the third stage of the demographic transition; the infusion of technology into developing countries and its effect on population growth.

ORGANIZATION OF THE UNIT

Each unit is divided into two sections — a teacher manual (TM) and a student manual (SM). The teacher manual includes the following:

Evaluation: This is an evaluation form which the teacher can use to measure the student's progress in learning about population matters and issues. The same instrument may be used before and following instruction as pretests and posttests. It is expected that the results of the tests will be used by the teacher to improve instruction. (See separate test booklet).

Goal: This is a statement of what the unit seeks to accomplish in a broad sense.

Objectives: These are specific statements expressed in behavioral terms as to what the unit and its component parts seek to achieve. The objectives, stated in terms of student behaviors, include both population content and inquiry process statements.

Hypotheses: These are potential statements of relationships which seek to explain population phenomena (e.g., relationships among population components — mortality, fertility, migration — or relationships between changes in population and changes in the socio-political world). While these hypotheses may serve as a broad framework for the pattern of questions and the classroom discussion they are not intended to be used in their present form. As part of the program they are intended primarily for teacher use. Students should

be encouraged to exercise their own judgement about the material and should generate their own hypotheses or generalizations, using their own words and expressions. One important thing to remember here is that forming a hypothesis is the beginning, not the end, of inquiring into population matters.

Background Information: Here the unit provides additional information to the teacher; (i.e., beyond what is available in the student manual). This section would be very important if the topic is complicated or quite new to the teacher and the class.

Materials and Equipment Needed: Student materials are organized around springboards. A springboard is a motivating and thought-provoking material which is used to open up discussion on a topic. Springboards can be produced in several forms including documents, poems, newspaper articles, artifacts, music, or audio-visuals. All the materials furnished in the student packet are normally listed here, as well as other resources and equipment required for a class session.

Procedures: This section provides instructions as to how the materials can be used. This section also includes a list of "What Will You Find Out?" and "What Do You Think?" questions that should be used in class. As was the case with the hypotheses, however, these questions should not be thought of as absolutes. Questions should be modified or new

questions should be added, if necessary, but these changes should be kept to a minimum.

The student manual includes all the springboards which are prepared for classroom use. These materials are the colored pages in this manual, and in most cases should be made available in multiple copies. Each student is expected to have one complete set. In other cases, especially when audio-visuals are used, there is only one set for the entire class.

Each student springboard is marked according to the unit it belongs to. For example, SM-IV-1 means that the springboard is part of Unit IV and that is designed for Day 1. Each unit is divided into five-day segments, normally one class period a day. This does not mean that the teacher may not use the materials for extended periods of time. Rather than thinking of a fixed five-day framework, the teacher should think of a flexible use of materials which is in line with the overall instructional objectives.

For the teacher who wants to get additional information and suggestions on teaching population concepts through inquiry the following references might be useful:

Massialas, Byron G., and Jack Zevin, Creative Encounters in the Classroom: Teaching and Learning through Discovery, New York: John Wiley & Sons, 1967. Provides examples on inquiry teaching and learning and an exercise on classroom use of population charts.

Massialas, Byron G., Nancy F. Sprague, and Joseph B. Hurst, Social Issues through Inquiry: Coping in an Age of Crises, Englewood Cliffs,

New Jersey: Prentice-Hall, Inc., 1975. Practical examples for teachers in dealing reflectively with social concerns in the classroom.

Nam, Charles B., ed., Population and Society, Boston: Houghton Mifflin, 1968. An anthology dealing with substantive population topics.

Options: A Study Guide to Population and the American Future, Washington, D. C.: Population Reference Bureau, 1973. Suggestions for teachers for introducing population ideas in the classroom. Related to the Commission Report and film on "Population Growth and the American Future."

Social Education, special issue on "Population Education," Vol. 36, No. 4 (April, 1972).

The study of population is not only important but it can be fun. We trust that you will try to teach and learn population concepts in this spirit and that our students will join us.

TM-VIII-1

GOAL:

To examine how fertility, mortality and migration together effect population changes within a society.

OBJECTIVES:

1. The student will discover how population in the U. S. changes by examining the rates of fertility, mortality and migration.

2. The student will use data on fertility, mortality and migration to determine the extent of population change during certain time intervals.

3. The student will examine how non-demographic factors (medical technology, natural disasters, values and norms) affect population growth by affecting one or more of the components of population change.

HYPOTHESES:

1. If the combined number of births and immigrants are greater than the combined number of deaths and emigrants, then the population of a country will increase.

2. If the number of births and immigrants are less than the number of deaths and emigrants,then the population will decrease.

3. The relative importance of fertility, mortality and migration in effecting population change may vary from country to country and over time within a country.

BACKGROUND INFORMATION:

Today's lesson focuses on the components of population change — migration (immigration and emigration), fertility (birth rates), and mortality (death rates). The changes in the population of any country can be evaluated in terms of the interaction of these three components. The following equation serves as a model for calculating population change.

Population change = births - deaths + immigration - emigration.

The population of the United States is used as a case study in today's

class session. The teacher should emphasize how population size would be affected if any one of these components was increased or decreased while the others remained stable (e.g., if the number of deaths decreased, the population would increase). This session could be successfully team-taught with the math teacher.

MATERIALS NEEDED:

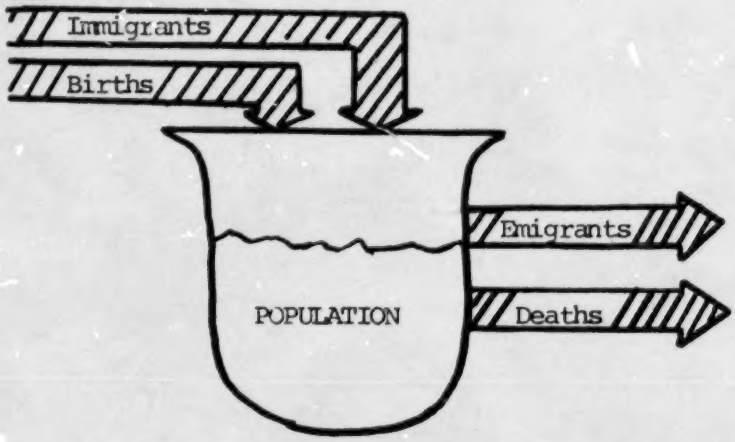
..Transparency showing Dionos data
..Class copies of springboard #1 (Riddle Worksheet)

PROCEDURES:

The teacher should begin this class session by asking the students the following question: "How do populations change?" As the students suggest ways in which populations change, the teacher should write them on the blackborad. This activity should help the students arrive at the nature of the components affecting population changes. Once the list has been compiled the teacher should ask the students how these components affect populations (i.e., will the population increase or decrease if X occurs). As the students tell whether the population would be increased or decreased, the teacher should place a "+" or a "-" beside the words. The difference between primary factors (migration, fertility, mortality) and secondary factors (wars, disease, famine) should be noted. From this discussion the formula for population change can be derived.

Population change = births - deaths + immigration - emigration

One device often used to illustrate this formula is to draw on the board a container with two tubes leading into it and two tubes leading out, as below:



The level of the fluid in the container (population) determines the size of the population.

I. The following riddle can be done with the entire class to help the students become familiar with the equation for population change and with the manipulation of data. A transparency is provided which can be used to focus the work of the class. The data are for a fictitious country, Dionos.

> In Dionos one person is born every 20 seconds; one person dies every 30 seconds, one immigrants enters every one minute, and one emigrant leaves every three minutes. If Dionos had 1,000,000 people to begin with, how many people will there be 15 minutes later? One hour later? Twenty-four hours later?

Solution:

During this 15 minute period:

45 people will be born.
30 people will die.
15 immigrants will enter Dionos.
5 emigrants will leave Dionos.

Therefore,

Population growth = births - deaths + immigrants - emigrants
= 45 - 30 + 15 - 5
= 25

This means, therefore, that there will be 1,000,025 people after 15 minutes. There will be 1,000,100 people an hour after starting time, and there will be 1,002,400 people after twenty-four hours.

II. The students should be given time to work springboard #1 (Riddle Worksheet) individually or in small groups of two to three persons. These data are taken from the Bureau of the Census of the United States. Once the students have completed the activity, the following questions should serve as a framework for class discussion.

WHAT DO YOU THINK?

1. How does immigration and emigration affect the population?
   What would happen if emigration was stopped?
   Would this affect world relations? How?
   What would happen if immigration quotas were opened to let more people in?

2. Imagine that there was a breakthrough in medical technology, which cut the death rate of the United States in half. What would happen to the population? (Students should be able to say whether it would increase or decrease the population).

3. What kinds of things might reduce this population growth? (War, famine, plagues, emigration, lower birth rates, etc.).

* * TRANSPARENCY * *

Population Change in Dionos
(population = 1,000,000)

One person is born every 20 seconds
One person dies every 30 seconds
One immigrant moves into Dionos every 60 seconds
One emigrant leaves Dionos every 3 minutes (180 seconds)

---

1. How many people will be born in 15 minutes?

2. How many people will die in 15 minutes?

3. How many immigrants will enter Dionos in 15 minutes?

4. How many emigrants will leave Dionos in 15 minutes?

5. What is the population growth in a 15-minute period? Remember that population growth is calculated this way:

births - deaths + immigrants - emigrants = Population Growth

_____ - _____ + _____ - _____ = _____

6. What is the total population of Dionos at 9:15 a.m.?

205,000,000 people + population growth = new total

_____ people + _____ = _____

7. How many people will be added to the population:

at 9:30 a.m.? _____

at 10:00 a.m.? _____

in 24 hours? _____

SM-VIII-1
Springboard #1

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RIDDLE WORKSHEET

The population of the U. S. changes every minute. Approximately every 10 seconds a new person is born. Every 15 seconds a person dies. Every 90 seconds an immigrant enters the U. S. Every 15 minutes an emigrant leaves the country. Assume the population of the U. S. was 205,000,000 people at 9:00 this morning. How many people will there be in the U. S. at 9:15 this morning?

1. How many people will be born in 15 minutes?

2. How many people will die in 15 minutes?

3. How many immigrants will enter the U. S. in 15 minutes?

4. How many emigrants will leave the U. S. in 15 minutes?

5. What is the population growth in a 15-minute period? Remember that population growth is calculated this way:

   births - deaths + immigrants - emigrants = Population Growth

   _____ - _____ + _____ - _____ = _____

6. What is the total population of the U. S. at 9:15 a.m.?

   205,000,000 people + population growth = new total

   _____ people + _____ = _____

7. How many people will be added to the population:

   at 9:30 a.m.? _____

   at 10:00 a.m.? _____

   in 24 hours? _____

TM-VIII-2

GOAL:

To examine how population change varies from country to country; and to examine two aspects of change - population size and rates of population change.

OBJECTIVES:

1. The student will discover how population changes in a developing country (Sri Lanka) by analyzing the rates of the three components of population change within the country - fertility, mortality and migration.

2. The student will develop a conceptual understanding of the term "rate of population change".

3. The student will examine the relationship between the size of a population and its rate of population change.

4. The student will discover the difference between the "rate of population change" and "absolute population growth" of a population.

HYPOTHESES:

1. If a country has a rapid rate of population change, then extensive economic and social adjustments may be made.

2. If a country has a rapid rate of population increase, the people may be unprepared to cope with the sudden changes necessitated by the increase (food production, changes in social norms).

3. A country may have a small rate of population change, but substantial change in its absolute population size.

4. A country may have a high rate of population change, but moderate change in its absolute population size.

BACKGROUND INFORMATION:

Today's class session reinforces the concept of population change through an examination of the migration, fertility and mortality patterns in Sri Lanka (formerly Ceylon). In addition, the concepts of

"absolute population change" and "rate of population change" are introduced. The students evaluate some of the basic problems resulting from a rapid rate of change. "Rate of population change" refers to the relative number of people added to a population, while "absolute population change" refers to the actual number of people added.

When compared to the population change of the United States, the absolute population change of Sri Lanka is quite small. The absolute number of people added to the U. S. population every twenty-four hours is more than six times as great as that of Sri Lanka. In spite of this, Sri Lanka has a greater population problem than the United States. This is due to the "rate of population change" in Sri Lanka. Each year Sri Lanka increases its population by two to three percent (2-3%) while the United States increases its population by about one percent (1.1%). Today's session will help the students discover the significance of this difference.

MATERIALS AND EQUIPMENT NEEDED:

..Class copies of springboard #1 (Sri Lanka Riddle)
..Transparency of Sri Lanka Riddle
..Transparency of rate of population change for U.S. and Sri Lanka
..Class copies of springboard #2 (Sri Lanka: A Case Study)
..Cassette recorder and tape VIII-2 (Sri Lanka: A Case Study)

PROCEDURES:

I. Today's session should begin by having the students recall from the previous session the number of people that were added to the population of the United States in a twenty-four hour period (3,744 people). Each student should be given springboard #1 (Sri Lanka Riddle) to

calculate the population change in Sri Lanka in a twenty-four hour period (692 people). Before solving the riddle, the students might locate Sri Lanka (formerly Ceylon) on a world map. A transparency of the Sri Lanka Riddle is provided to facilitate class discussion. After working the riddle, the students should express their opinions on whether the United States or Sri Lanka has the faster population growth. The students may respond in two ways. If one responds in terms of absolute numbers, the U. S. population is growing faster than that of Sri Lanka. If one responds in terms of the number of people added compared to the number of people already in the country, Sri Lanka is growing faster than the United States. The students should not be told which response is best. This will be brought out in class discussion.

The following activity should be done with the entire class to determine the rate of population change for the United States and for Sri Lanka. A transparency has been provided as a springboard for class discussion.

1. How many people will be added to the population of the U. S. in one year? (365 days x population change for one day).

2. The annual "rate of population change" can be calculated using the following formula:

$$\text{Rate of Population Change} = \frac{\text{No. of people added (or subtracted) each year}}{\text{Total Population}} \times 1{,}000$$

3. U. S. annual rate of change = _____

4. Sri Lanka annual rate of change = _____

Given the annual rate of population change for Sri Lanka, the population will double every 27 years. The population of the United States will double every 70 years.

WHAT DO YOU THINK?

1. Suppose by population growth we mean how fast the population is increasing, that is, how many people are added each year, compared to how many there were at the beginning of the year. Which country would you say has a "faster growing" population? Explain your answer.

2. Which definition of "faster growing population" do you think is more accurate — the absolute number of people added or the rate of population increase? Why?

3. Which country probably has a bigger problem due to population change? Why?

4. What are some of the problems that Sri Lanka might have due to its rate of population change? How might some of these problems be resolved?

III. After the students have briefly discussed some of the problems of Sri Lanka, they should be given springboard #2 (Sri Lanka: A Case Study). Cassette tape VIII-2 has a voice recording of the case study made by a person from Sri Lanka. It should be played while the students read the case study. Each student should work individually or in groups on the questions presented on the springboard.

TM-VIII-2

* * TRANSPARENCY * *

RATE OF POPULATION CHANGE

1. How many people will be added to the population of the United States in one year? (365 days x population change for one day).

2. To determine the annual "rate of population change" use this formula:

$$\text{Rate of Population Change} = \frac{\text{Number of people added (or subtracted) each year}}{\text{Total Population}} \times 1{,}000$$

3. United States annual rate of population change = _____

4. Sri Lanka annual rate of population change = _____

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SM-VIII-2
Springboard #1

Sri Lanka Riddle

There is a tropical island in the Indian Ocean called Sri Lanka. In this country a person is born approximately every 90 seconds, a person dies every 5 minutes, an immigrant enters the country every 60 minutes and an emigrant leaves the country every 360 minutes, (6 hours). Assume the population of Sri Lanka was 12,800,000 people at 9:00 this morning. How many people will there be after 6 hours? (i.e., at 3:00 in the afternoon).

1. How many people will be born in 360 minutes? (6 hours).

   _____

2. How many people will die in 360 minutes? _____

3. How many immigrants will enter Sri Lanka in 360 minutes?

   _____

4. How many emigrants will leave Sri Lanka in 360 minutes?

   _____

5. What is the population growth in a 360 minute period?
   Remember -

   Births - Deaths + Immigrants - Emigrants = Population Growth

   _____ - _____ + _____ - _____ = _____

6. What is the total population of Sri Lanka at 3:00 p.m.?

   _____

   12,800,000 people + population growth = new total.

7. How many people were added to the population in 6 hours?

   _____

8. How many people will be added to the population in 24 hours?

   _____

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CASE STUDY OF SRI LANKA

Ayubowam. (Which is a greeting meaning "May you live long".) I come from a tropical island in the Indian Ocean named Sri Lanka (formerly known as Ceylon). It is about twenty miles off the tip of South India, and consequently our culture is similar to that of India. However, over the past 2000 years we have created a culture distinctively our own. Our national language, Sinhala, is spoken only in our country and our main religion is Buddhism. The Island is only about the size of West Virginia, but the population is almost 13 million. We are mainly an agricultural society and the per capita income is $137.00.

Sri Lanka today is struggling to survive. The economy of our country is hardly large enough to provide the basic needs of the people. The threat of famine and starvation is very real to us. In the 1950's soon after Sri Lanka gained independence, the government undertook many social welfare services to raise the general standards of living of our country. Education became free for everyone from grade one right through the university. Health care and medical facilities also became free for all our citizens. Each family below a certain income level gets a free measure of rice (which is our main food) every week. The government also pays part of the cost of sugar and flour that people buy, up to a certain amount.

Since these activities were undertaken, the population has almost doubled on our tiny island. There are now twice as many people to educate and feed, but not twice as much money with which to do this. The amount of money our government spends on these services greatly limits

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the amount it can invest in industries. Sri Lanka gets most of its income by exporting teas, rubber and coconut products. The competition to sell these products in the world market has increased. Thus, the demands for our products have decreased since we are competing with other countries. The money we get from these exports is decreasing while the price of food and other necessary imports we must purchase is increasing.

In the past the people of Sri Lanka have enjoyed a standard of living and education much higher than in most Asian countries. It is becoming economically impossible to maintain these standards. Immediate thoughtful action is essential to ward off the threat of famine and improve its economy.

DISCUSSION:

Suppose you have been asked to be a member of an advisory committee in Sri Lanka to help with its problems. The information you have just read is all the information you have received about the country. Read it carefully and answer the following questions:

1. What do you think is the most immediate problem facing Sri Lanka today? Why?
2. Design a plan of action that would help to eliminate or reduce this problem.
3. What are some long-range policy plans this committee could recommend?
4. Do you think that population change in Sri Lanka has made it more or less difficult for the country to cope with social and economic change?

TM-VIII-3

GOAL:

To investigate some of the major causes and consequences of rapid population growth in the developing countries.

OBJECTIVES:

1. The student will develop a conceptual understanding of the terms "developing" and "developed" countries.

2. The student will examine how the infusion of medical technology into developing countries has drastically reduced death rates without having an immediate effect on the birth rates.

3. The student will compare the patterns of the demographic transition in developed and developing nations.

4. The student will speculate on the probable consequences of rapid population growth in Mauritius and in the world in general.

HYPOTHESES:

1. If death rates are reduced rapidly due to the introduction of new technology and if birth rates are not changed accordingly then a rapid rate of population increase will result.

2. If a new technology directly and positively affects something people value greatly (such as decreasing the number of deaths), then they are likely to adopt it.

3. If a new technology changes a value which people respect greatly (such as having a large family), then they may be reluctant to adopt it.

BACKGROUND INFORMATION:

During the past century, for the first time in the recorded history of mankind, a spectacular and rapid growth in population has occurred. This rapid growth is not due to a rapid increase in the birth rates. It can be attributed primarily to a rapid decrease in death rates. Advances in technology (especially medical technology) and improvements in levels

of living during this time period have made it possible to introduce quick controls of death rates on a large scale. Often birth rates have not shown a corresponding decline. In fact, in many developing countries the birth rate has remained high. The result has been a dramatic increase in population size.

In today's class session, the students will evaluate differences in the patterns of the demographic transition between developed western societies and developing countries (see Episode I for a review of the demographic transition). In addition, the students will investigate some of the reasons for this population increase, the consequences of the increase, and the attitude of the population toward the introduction of technology into a country to reduce fertility and mortality rate.

MATERIALS AND EQUIPMENT NEEDED:

..Class copies of springboard #1 (Mauritius: A Case Study)
..Cassette recorder and tape VIII-3 (Mauritius: A Case Study)
..Class copies of springboard #2 (Demographic Transition)
..Magazines, newspapers
..Medium size construction paper for collage.
..Glue
..Scissors
..Crayons

PROCEDURES:

I. Yesterday the students found out that different nations (i.e., the United States and Sri Lanka) have different rates of population change. In today's session the students will be introduced to one of the major causes of rapid population change in developing countries today.

Springboard #1 (Mauritius: A Case Study) deals with the infusion of medical technology by developed countries into developing countries and the consequences of this infusion for the population changes of the latter. It should be read silently while the students listen to a recording of it on the cassette tape recorder. The following questions could serve as a focus for class discussion.

WHAT DO YOU THINK?

1. List at least five "developed" and five "developing" countries. What are some of the differences between developing and developed countries?

2. Is Mauritius a "developed" or a "developing" country? What information can you get about it? Explain.

3. Which country probably has the highest death rate today, Mauritius or the United States? Why do you think so? Which country probably had the fastest decline in its death rate, Mauritius or the United States? Explain.

4. In Mauritius, before 1940, the chances of surviving to adulthood, let alone a "ripe old age", were quite slim. Considering this, if you were living in Mauritius at that time, how many children would you want to be born into your family? Explain.

5. After the chances of survival improved greatly in Mauritius, do you think people would still want as many children to be born ten years later? (Remember, the values of a whole society usually take a long time to change).

6. Do you think it would be easier to reduce the birth rate or the death rate in a country? Explain.

7. How can a country cut down on deaths? (Refer to the ways Mauritius cut its death rate).

8. If the number of deaths decreased, but the number of births remained the same as before, what would happen to the population? How might this affect the population?

9. Should a developed country introduce technology into a developing country that would drastically reduce its death rate in a short period of time? Explain.

II. Following the above discussion, each student should be given a copy of springboard #2 (The Demographic Transition). Each student should label the graphs as representing either a developing country (Mauritius) or a developed country (Sweden). The teacher should review the graphs with the students to make sure they can read them. Following this, each student should write an explanation for his response. (Graph A represents a developed country; Graph B represents a developing country).

WHAT DO YOU THINK?

1. Do you think the people of Mauritius were prepared economically and socially to cope with the sudden change in population? How would you feel if you had been living there?
2. What kind of problems do you think Mauritius had to face because of the rapid population growth?
3. How might it have affected the farm land and sugar fields?
4. Do you think the death rate should have been reduced so quickly? Why or why not?
5. While they were trying to cope with the problem of rapid population increase the people of Mauritius were hit by a very destructive hurricane in the 1960's. What might a natural disaster like this do to the situation?
6. What difference does it make to you and your family whether or not Mauritius' population increases or decreases? Explain.

III. The following optional activities could serve as a means of evaluating student comprehension of the problems faced by developing countries today.

A. A class debate could be developed using the following issue: Should the United States government introduce technology into a developing country (Mauritius or any other country of interest) that would drastically reduce its death rate in a short period

of time? Students should be organized into two groups. Following the debate, each student could write a paper taking a position with one of the sides of the issue, explaining why he agrees with one point of view and disagrees with the other. In addition, based on their own readings the students should point out weaknesses and strengths in the arguments.

B. The students should be given magazines, newspapers, etc., provided either by the teacher or the students, themselves, and they should be asked to make a collage of materials with two themes. The first theme should show consequences of rapid population increase and over-population, and the second theme should show the effects of slowing down population increase and avoiding over-population. This activity could be done in groups. The collage could consist of pictures, words, and slogans, including the students' own drawings or writings. A collection of fourteen slides of a collage is included in the media kit (VIII-3). These slides may be shown to the students before they begin their own collages to provide direction. In addition, they may be shown after the students complete their collages for comparative purposes. The student who developed the collage in the slides used the eastern symbol of "yin and yang" to show the close relationship that exists between the two opposing forces of population change - population increase and population decrease.

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MAURITIUS: A CASE STUDY

Throughout history developing countries have had relatively high death rates. Consequently they have developed social customs which combat high death rates. For example, if a family wanted to have two sons to grow up to adulthood, they might have six or seven children in order to increase the chances that two would survive childhood. Thus, the birth rate would be high. Religious doctrines, laws, customs, marriage patterns and education systems would encourage large families.

All countries value life. Consequently any technology or innovation introduced into a society to reduce its death rate is readily accepted. As this happens, however, people do not readily change their laws and customs which support a high birth rate. Consequently, rapid population growth occurs since more children enter adulthood, and people live longer.

Gradually, people begin to change their attitudes about family size. For example, as a family realizes that most of its children are living to become adults, they might realize that they do not need to have six children in order to insure that two become adults. Thus, the birth rate is reduced until it is as low as the death rate. In the western world, it took approximately 150 years for the transition to take place.

Once discoveries were made which reduced the death rate, it was possible for other countries to use them without going through the same process. Improved sanitation, increased food supply, medical technologies and increased standards of living could be introduced into developing countries in a short period of time. A good example of this is what happened in Mauritius.

MAURITIUS

Mauritius is a small island in the Indian Ocean, about 500 miles east of Madagascar. It is 39 miles long and 29 miles wide - about half as big as Rhode Island, but has almost twice as many people as that state. The total population of Mauritius is 773,573. The average annual income for each person in Mauritius is only $225. The island was formed by volcanoes. The eruptions left the island covered with rocks and lava which the farmers have to clear before they can plant crops. The land slopes gently upward from the coast to a plateau. The eastern slope of this plateau is blessed with abundant rainfall. Sometimes, the island suffers from disastrous hurricanes which leave many people without homes and ruin the crops. Half of Mauritius is covered with sugar cane fields. Sugar cane is the island's chief export. (It brings in 97% of the export income). This industry employs two-thirds of all the workers. The farmers also grow tea and tobacco. Almost all of the island's food (such as rice, meat, grain, wheat, flour) has to be imported.

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A CHANGE FOR MAURITIUS

What happened to the population when medical discoveries of Western Europe were "imported" to Mauritius? The people of Mauritius suffered from epidemics of malaria. In 1945 there were 3,500 deaths due to malaria alone in this tiny island. Then, the insecticide DDT was brought in from the Western European countries. DDT destroyed the mosquito which caused this disease. As a result, 10 years later there were, virtually, no deaths due to malaria in Mauritius. The death rate fell sharply from 36 per thousand in 1941 to 20 per 1,000 in 1947. In 8 years the life expectancy (the number of years people are expected to live) of the people of Mauritius rose from 33 years to 51 years. This same change took 125 years to achieve in Sweden. This is just one dramatic example of the rapid fall in death rates in developing countries.

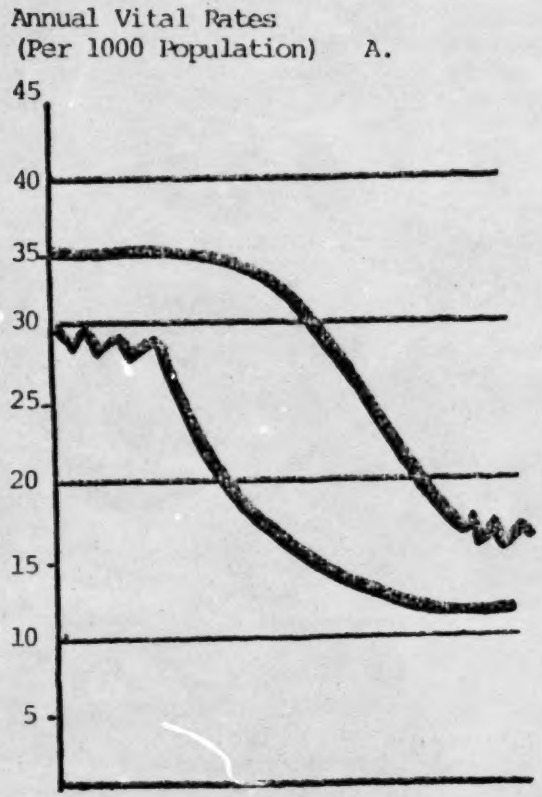
Adapted from: Encyclopaedia Britannica, Vol. 14, Chicago: William Benton, Publisher, 1973. p. 1129-1130.

also from: Calvin Goldscheider, Population, Modernization and Social Structure. Boston: Little, Brown & Company, 1971. p. 115.

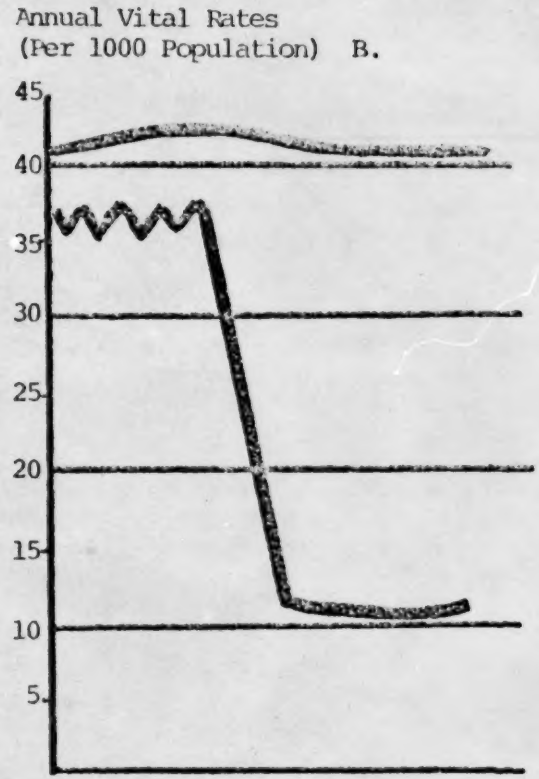
SM-VIII-3
Springboard #2

THE DEMOGRAPHIC TRANSITION

Study the two graphs. One represents the Demographic Transition in a developed country and one represents the Demographic Transition in a developing country. Circle the appropriate word beneath the graph to indicate which type of country the graph represents. Explain in writing why you answered the way you did.



Developed or Developing



Developed or Developing

Graphs adapted from: Phyllis Tilson Piotrow, World Population Crisis: The U. S. Response. New York: Praeger, 1973. p. 6.

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TM-VIII-4

GOAL:

To explain the relationship between resources and consumption, and to examine the effects of population growth on resource consumption.

OBJECTIVES:

1. The student will critically analyze two sides of a debate on the world's resources and food consumption.

2. The student will state possible solutions to avoid a crisis in the availability of resources; the student will discuss possible obstacles to these solutions, and problems which might result from the solutions themselves.

3. Given a hypothetical country, with a rapid rate of population growth, the student will discuss possible methods of meeting the increased demands placed on the society.

HYPOTHESES:

1. If the resources within a country do not increase as rapidly as the consumption of resources by the population, then a crisis of shortages may result.

2. If a population increases, then consumption of vital resources may also tend to increase.

3. As a country becomes more developed, its people will want to consume more, and a greater need for resources will result.

4. If the resources available are less than the minimum amount needed to sustain life, then the country will be required to import resources; if the country is unable to import essential resources, then the death rate may increase.

BACKGROUND INFORMATION:

The past few decades have been years of rapid growth in technology, in food production (known as the Green Revolution), and in energy production. Synthetic products and new and faster ways of obtaining the world's resources, such as minerals, have been discovered and used. But the population, too, has been growing very rapidly and the question facing

the world today is how long food and energy can keep up with the increase in population, before the supply of basic resources is depleted. Two-thirds of the world's population already does not have enough nutritious food. Many people argue that if the population of the world continues to grow at the present rate it will become impossible to support the population and the death rate will rise drastically.

Some experts feel that technology can make it possible to increase the amount of food and other resources available to supply the needs of the people for some years to come. Others, however, feel that a crisis is just around the corner because the population will increase much faster than the production of food, energy, fuel, minerals and other resources, and because producing more things rapidly will deplete the resources of our environment.

MATERIALS NEEDED:

..Class copies of springbaord #1 (Will There Be A Food Crisis?)
..Class copies of springboard #2 (The Island of Gilgamesia)

PROCEDURES:

I. Today's class session should begin by having each student read springboard #1 (Will There Be A Food Crisis?) while listening to cassette recording VIII-4. This springboard presents some of the arguments of those who say a crisis in resources is imminent and those who say it is not. The following questions could be used to promote a discussion on the material:

WHAT DO YOU THINK?

1. Have you ever been hungry? How does it feel to be really hungry? What new kinds of food do you think we might be able to find or invent so that people will not have to go hungry in the near future?

2. What would happen to the death rate of the world if our resources do not increase rapidly enough to meet our minimum basic needs? How might population growth be affected? Explain.

3. Are there any large areas in the world that are uncultivated? Where are they? Could we grow food in these areas? What obstacles might we have to face if we were to grow food there?

4. The U. S. can produce more food than that needed to meet our basic needs. Should we grow more food and give it to other countries? Why or why not?

5. Under what conditions should we give food to other countries? Discuss.

6. The U. S., which has 6% of the world's population, consumes over 50% of the world's mineral resources. Do you think we should reduce the demand for goods so we can consume less? Why or why not? How might this be done?

7. If the U. S. did slow down its economic development, would there be any problems created for the country? How might this affect you and your family?

8. Debate Topic: Will the United States face a crisis in resources in the next twenty-five years or will technology be able to provide the resources needed to sustain the present level of consumption in the U. S.?

II. Following the class discussion the class should divide into four groups of equal size. The students should be given a copy of springboard #2 (The Island of Gilgamesia). Each group should be assigned to one area:

a. The urban area, including the industry.
b. The farm land, most of which is cultivated with food producing crops.

c. The timber land.
d. The lakes, rivers, and ocean, including the fishing industry and the water supply for the people and the farms.

Each group should discuss how they could increase the population in their area to supply the demand of the fast growing population. Each group should write or illustrate their proposals for the entire class.

After the students have written their proposals, each group should orally report to the class. It is essential to the effectiveness of this activity that, following the reports, the class discuss and question each other's proposals and examine the consequences of each proposal. For example, if the people in charge of the farmland decide to use pesticides and fertilizers to improve crops, the people in charge of the water supply could point out the risk of polluting the water by the use of too much fertilizers or pesticides. The class should try to arrive at a plan which each group supports. The idea that population growth in only one of several factors contributing to potential shortages of resources should be stressed.

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SM-VIII-4
Springboard #1

WILL THERE BE A FOOD CRISIS?

View A:

People who say we are running out of food are simply refusing to look at the facts. Food production has increased greatly in the past decade. This "Green Revolution" has taken place in both the richer and the poorer countries. New varieties of seeds, pesticides and fertilizers have been developed which can increase crops of food. In Asia a new strain of super-rice has been developed which can feed more people with higher nutritional value than we ever thought possible. Scientists are working to develop similar products in many countries on the earth.

Many new areas and sources of food can be found. The ocean offers a source of food which hasn't even begun to be developed. By desalinating ocean water, critical water shortages can be avoided. New sources of energy can be produced from the sun and from atomic power. The earth still has many reserves of coal, oil and gas which can be used if new techniques of mining are developed. Finally, there is much food going to waste. For example, every year Americans use tons of tuna fish in pet foods. If food was managed better to avoid waste, we would not need to fear a shortage. What is needed to avoid a food crisis is a better use of the resources we already have. Technology will provide the answers to the questions we have — just as it has done in the past.

View B:

I think that the world is in the middle of a serious food crisis. The problem is simple. The population of the world is growing so fast that there is not enough food to feed everyone. It is true that new

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types of grains, such as the so-called super-rice, have been developed. With super-rice we can grow more rice on a smaller amount of land than we could before. Unfortunately, the new types of grain need a great deal more fertilizer to grow than regular grains. It takes energy to produce fertilizer and we are quickly running out of ways to produce energy. Therefore, we cannot count on the super grains to solve our problems.

Many people feel that we simply need to cultivate new land or improve farming techniques. In the areas where the food crisis is worst, such as Africa and Asia, there is very little land available. Much of Africa is desert and the size of the desert areas seems to be growing. In many parts of Africa it has not rained very much for years and hundreds of thousands of people have already starved. It is also difficult to improve the farming techniques in these areas because the people do not trust new methods. They prefer to stick to their traditional ways, even though they are not very efficient for raising food.

Another problem is that resources are not distributed evenly around the world. Even though the U. S. has only six percent (6%) of the world's population its people consume over fifty percent (50%) of the world's resources. As the technology in other countries improves and their populations increase these countries will begin to consume more resources. There is a limit to the amount of consumption that the world can support. Hundreds of thousands of people have already died of starvation during 1973-74. Unless we limit the rate of population growth and change our patterns of consumption the food crisis will grow much worse. We have very little time left to prevent this crisis.

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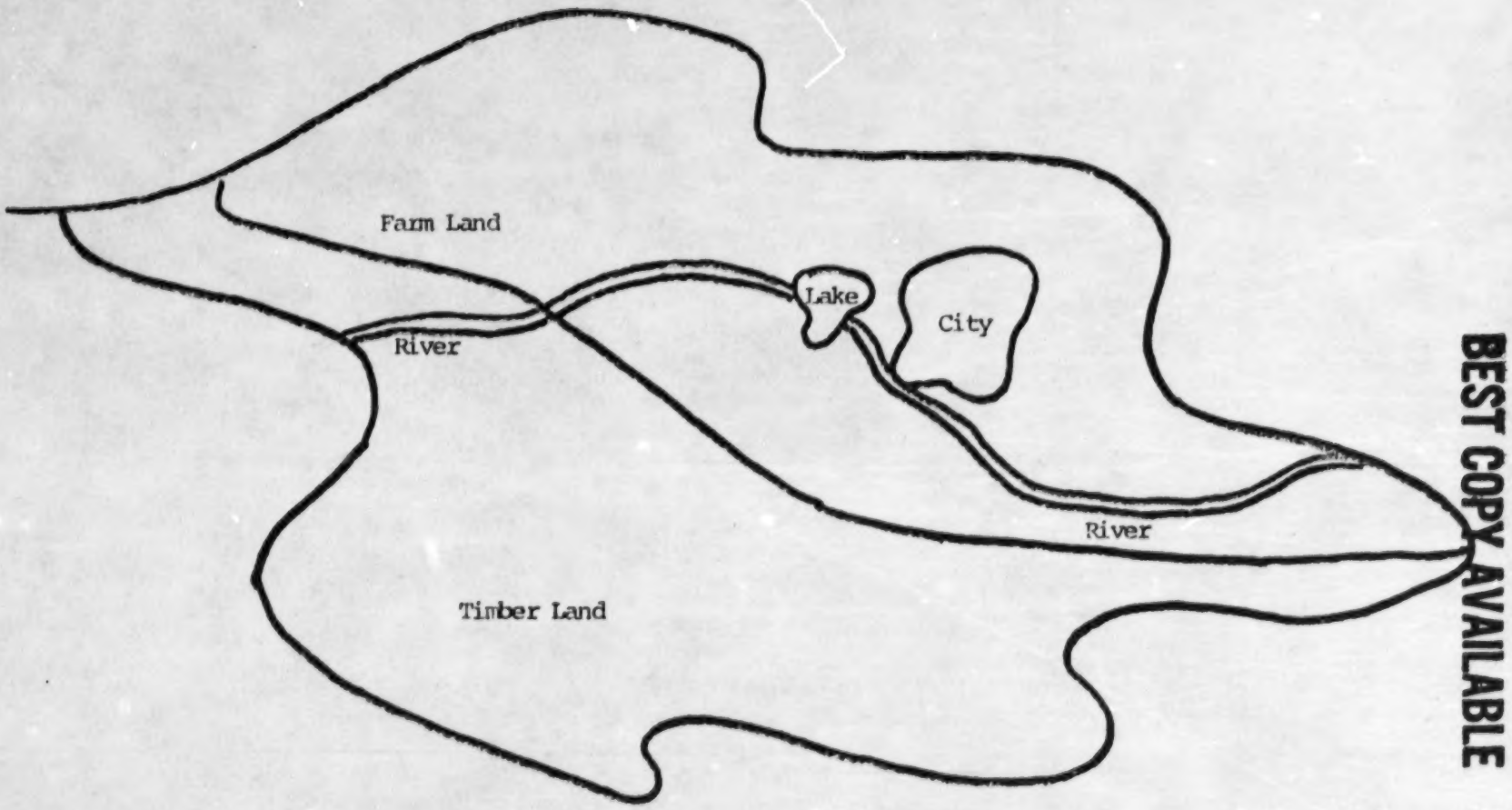
Do you agree with View A or View B? Will there be a food crisis in the next twenty-five years? Would you investigate this topic and prepare a good debate with some of your classmates?

SI-VIII-4
Springboard #2

THE ISLAND OF GILGAMESIA



Gilgamesia is an island that is 85 miles long and 45 miles wide. It has one major city where most of its population lives. The population consists of 55,000 people and has an annual rate of increase of 2%. This means that over 1,100 people are added to the population each year.

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THE ISLAND OF GILGAMESIA

You are a citizen of the Island of Gilgamesia. Your island has a serious problem due to its rapid population growth not matched with production of food and other supplies. The governor of the island has appointed four groups to study the population problem. Each group is to develop a plan for solving the problem to recommend to the governor. Remember to keep the following points in mind as you develop your plan:

a. Would your plan create environmental problems - water pollution, air pollution, or soil erosion?

b. Do you think it would be better for the population if your area were increased (or decreased) in size? If so, draw new boundaries on the map and explain why you think it is better.

c. Remember: those groups in charge of the other areas are making changes, too. Try to think of the interactions between areas which will be of mutual benefit.

I. Our group is in charge of making decisions about the area of _____. (urban area, farm land, timber land, water).

II. If the population Gilgamesia continues to grow as rapidly as it is now growing, at least three problems to be resolved by our group are:

a._____

_____

b._____

_____

c._____

_____

III. In order to resolve the problems stated above we recommend the following plan:

TM-VIII-5

GOAL:

To develop conceptual understanding of the "dependent age group" and the "productive age group" of a population; and to examine what effects the relative proportions of each have on the socio-political structure of a society.

OBJECTIVES:

1. The student will construct an age-sex pyramid for the U. S. for 1970.

2. The student will examine how the age composition of a society affects many non-demographic policies of that society.

3. The student will examine how non-demographic factors (such as war) affect the age composition of a society.

HYPOTHESES:

1. If the number of those in the dependent age group greatly exceeds the number of those in the productive age group, then it might be difficult to meet the economic needs of the entire society.

2. If the birth rate decreases, then the percentage of those in the early dependent ages will tend to decrease resulting in an increase in the percentage of the population in the productive ages.

3. If the age structure of a country changes drastically it will tend to cause corresponding changes in social policies. (Example - if the number of children increases greatly, more funds will be needed for education).

BACKGROUND INFORMATION:

The age of a population has an important effect on the society. If most of the population is very young then the few adults in the population have to support the many youngsters. The same is true if many are too old to work. Those who are too young or too old to work are said to be in "the dependent age group". Those adults who can work are said to be

in the "productive age group". In some developing countries over half of the population is "dependent". Since these countries have not reached the stage of "mass production" of goods it is very difficult for the few adults to produce enough for the entire population. It is helpful to know how many people there are in different age groups compared to the other age groups and the total population in making decisions about social, economic and political programs for a country. These ratios are frequently represented in an "age pyramid." An age pyramid shows graphically the percentage of a population in each age group by sex.

"A country with a recent history of high fertility has an age structure resembling a broad-based pyramid that rests on the youngest age groups and steeply tapers to a point at the oldest age groups. By contrast, a country with a history of low fertility has an age structure that yields an almost rectangular appearance in moving up from the base of the youngest to the oldest age groups. Wars and other phenomena that produce temporary fluctuations from the secular trend result in slight irregularities in the sides. In the high-fertility situation, there are always more people in the next lower age band. In the low-fertility situation, the adjacent numbers are roughly equivalent, lending a certain demographic stability to the social structure."*

MATERIALS NEEDED:

..Class copies of springboard #1 (U. S. Age-Sex Pyramid)
..Class copies of springboard #2 (Age Pyramids for Two Countries)
..Class copies of springboard #3 (Budget Worksheet)
..Transparencies of U. S. Age-Sex Pyramid
..Transparency of Age-Sex Pyramid for Two Countries

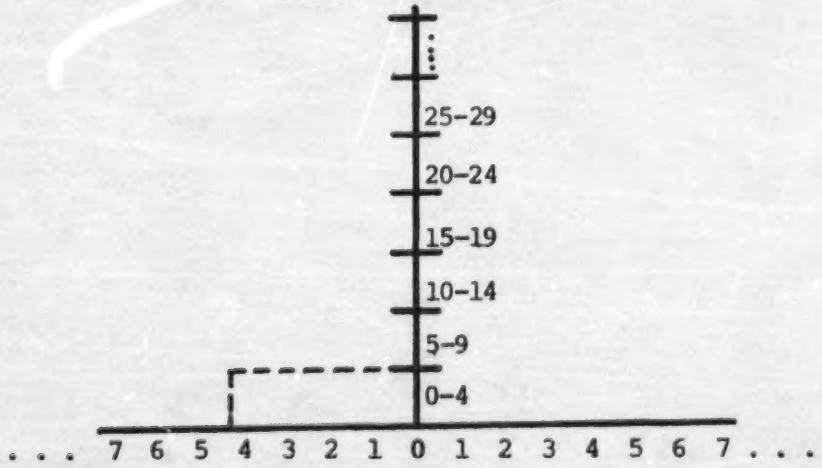
*Taken from: Reports on Family Planning/Population, #15, January, 1974. p. 12.

PROCEDURES:

I. An age pyramid is an easy way of discovering what percentage of a population is in each age group for both males and females. The students will begin this class session by drawing an age-sex pyramid for the United States based on 1970 census data. A chart concerning the percentage of the population in each age group by sex is provided.

Age Group	% Males	% Females
0-4	4.3	4.1
5-9	5.0	4.8
10-14	5.2	5.0
etc.		

The students should begin at the bottom of the pyramid by transferring the data for the 0-4 age group. A transparency is included so the teacher can demonstrate the procedure.



Since 4.3 percent of the population are males in the 0-4 age group, the students should draw a horizontal bar for the 0-4 year males

extending as far as the appropriate percentage. The same process should be followed for the female side until the pyramid is completed for the 75 and over age group. Each step-like horizontal bar represents an age group, of that sex. The complete pyramid should look similar to the transparency given for the U. S. As an added touch the students could illustrate each bar of the pyramid with faces representing people of that particular age group. As a class project some of the students may wish to work together on making an enlargement of this age-sex pyramid and fill in each bar with pictures from magazines of people of each age group. (For example, the bottom bar, 0-4 years would be filled in with four and one-third pictures of babies, with one baby representing each percentage of the population).

When the students have completed their pyramids, the teacher should ask the students a few questions to insure that they can read the pyramid:

Why are some bars longer than others? Shorter?
What percentage of the population are males between 15-19?
What percentage of the population are females over 75?
What percentage of the population are females between 50-54?

II. Once it has been established that the students can read an age-sex pyramid, springboard #2 (Age Pyramids for Two Countries) should be given to each student. A transparency is provided to facilitate class discussion. The following questions may serve as a framework for the discussion.

WHAT DO YOU THINK?

1. What is a dependent? What is it like to be dependent on another person? Which groups of people in a country tend to be dependent on others?

2. Which country has more young people? (ages 0-15 years). This country will have to produce more of certain things needed particularly by young people. Can you name some? Which of these things do you feel are very necessary and important for young people to have?

3. Which country has more elderly people (ages 60 and over)? What important things will society have to provide more of for these elderly people?

4. If there was a war, which part of the given chart is most likely to be affected first? What would it mean to that country to have a change in the percentage of people in that group? What might the new pyramid (immediately after the war) look like? What other things might change the appearance of the pyramid?

5. If a country had only 40% of its population in the 15-60 age group (the productive ages) what could be done to raise this percentage? (Example - they could either have people in that age group immigrate from other countries or decrease the number of people in the 0-15 age group by decreasing the number of births. This will have the effect of increasing the proportion of people in the 15-60 age group without actually increasing the number of people).

OPTIONAL ACTIVITY:

It is evident that the age structure of a country influences the policies of the government. For example, if there are many more young people than elderly people the government may want to spend much more on education than on "medicare".

Divide the students into groups. Each group will be the "budget committee" for the following two hypothetical countries with their respective age structures.

IKONUK:

55% of the population is 0-15 years old
43% of the population is 15-60 years old
2% of the population is over 60 years old

BAZUMBA LAND:

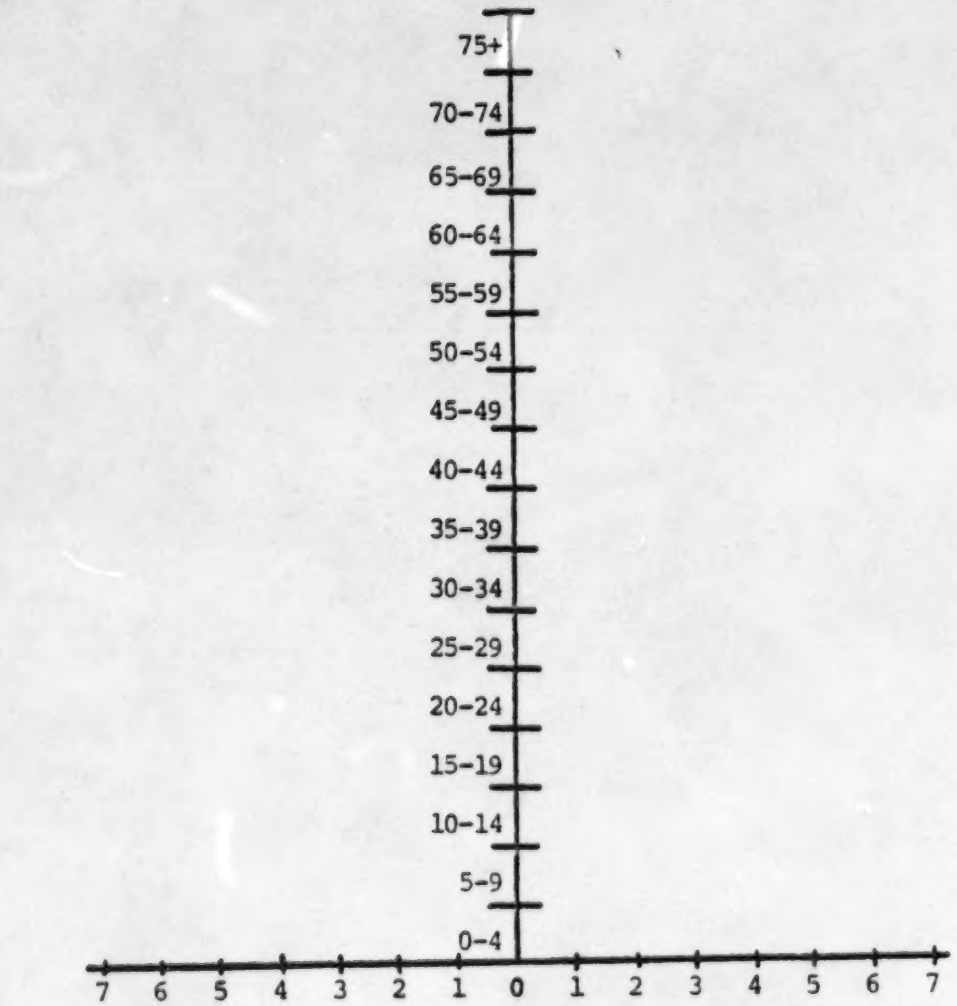
30% of the population is 0-15 years old
60% of the population is 15-60 years old
10% of the population is over 60 years old

Each country has 100 million dollars to distribute. Use the worksheet to show how you would distribute the money. How many million dollars would you give to each concern? Each group should compare their own budgets for the two countries and explain to the class why they decided to distribute the money the way they did.

SM-VIII-5
Springboard #1

U.S. Age-Sex Pyramid - 1970

Age by Years



SS-VIII-5
Springboard #1

U.S. Age-Sex Pyramid Data

1970

Age Group	Percentage of Male Population	Percentage of Female Population
0-4	4.3	4.1
5-9	5.0	4.8
10-14	5.2	5.0
15-19	4.8	4.7
20-24	3.8	4.1
25-29	3.2	3.4
30-34	2.8	2.9
35-39	2.7	2.8
40-44	2.9	3.0
45-49	2.9	3.1
50-54	2.6	2.8
55-59	2.3	2.6
60-64	2.0	2.3
65-69	1.6	1.9
70-74	1.1	1.5
75+	1.5	2.3
TOTAL	48.7%	51.3%

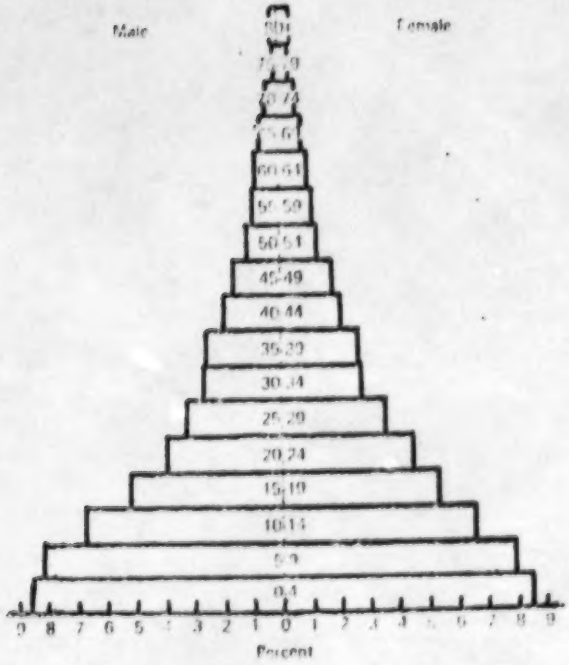
100%

Data calculated from: U.S. Bureau of the Census, Census of Population: 1970, Vol. I, part 1, section 1, table 49. Washington, D. C.: U. S. Government Printing Office, 1973. p. 1-263.

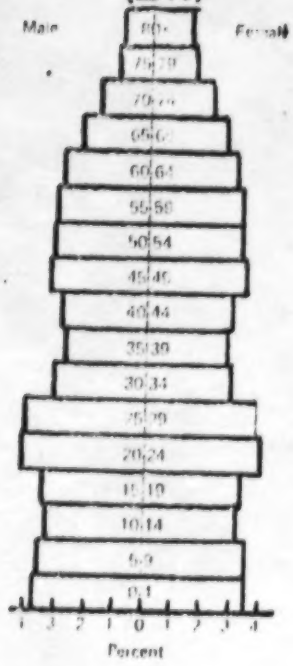
SM-VIII-5
Springboard #2

Which country is a developed country? Which country is a developing country? Explain your answer.

Country A
(1970)



Country B
(1970)



Taken from:
Reports on Family Planning/
Population, #15, January, 1974.

SM-VIII-5
Springboard #3

BUDGET WORKSHEET

YOU ARE A MEMBER OF THE TREASURY COMMITTEE IN YOUR COUNTRY. IT IS YOUR JOB TO DECIDE HOW THE MONEY IN YOUR COUNTRY WILL BE SPENT NEXT YEAR. YOU CAN SPEND A GRAND TOTAL OF $100,000,000.00. WRITE YOUR BUDGET USING THE FORM BELOW.

	Amount of Money Given For Expenditures	
	IKONUK	BAZUMBA LAND
Research and Development in Agriculture		
Research and Development in Industry		
Education - Elementary		
Secondary		
College		
For Large Families		
Housing For Small Families.....		
For Elderly Families		
Health and Welfare		
Labor Department		
Occupational Safety Commission.....		
Social Security and Medicare for the Elderly		
Environmental Protection Agency		
TOTAL (Should be 100 million for each country)		